



FTD-ID(RS)T-0793-89

FOREIGN TECHNOLOGY DIVISION



FRONTAL CLOUDS AND FLIGHT CONDITIONS IN THEM

bу

A.M. Baranov





Approved for public release; Distribution unlimited.

PARTIALLY EDITED MACHINE TRANSLATION

FTD-ID(RS)T-0793-89

8 September 1989

MICROFICHE NR: FTD-89-C-000762

FRONTAL CLOUDS AND FLIGHT CONDITIONS IN THEM

By: A.M. Baranov

English pages: 5

Source: Frontal'nyye Oblaka i Isloviya Poletov v Nikh,

Gidrometeorologicheskove Izdatel'stvo, Leningrad,

1964, pp. 1 Un. Nr.; 236-238

Country of origin: USSR

This document is a machine translation.

Input by: Charles W. Guerrant
Merged by: Charles W. Guerrant
Requester: FTD/WE/Major Kelchner

Approved for public release; Distribution unlimited.

Accession For

NTIS CTIBL
DITC TIB
United Total
J. Total Con

A-1

THIS TRANSLATION IS A RENDITION OF THE ORIGINAL FOREIGN TEXT WITHOUT ANY ANALYTICAL OR EDITORIAL COMMENT STATEMENTS OR THEORIES ADVOCATED OR IMPLIED ARE THOSE OF THE SOURCE AND DO NOT NECESSARILY REFLECT THE POSITION OR OPINION OF THE FOREIGN TECHNOLOGY DIVISION

PREPARED BY:

TRANSLATION DIVISION FOREIGN TECHNOLOGY DIVISION WPAFB. OHIO.

U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
A a	A a	A, a	Ϋ́Þ	Pp	R, r
5 6	Бб	B, b	Сс	Cc	S, s
B в	B •	V, v	Ττ	T m	T, t
۲۲	<i>[</i> •	G, g	Уу	Уу	U, u
Дц	Дд	D, d	Фф	Ø ø	F, f
Ξε	E .	Ye, ye; E, e*	X×	Xx	Kh, kh
Н ж	<i>ж</i> ж	Zh, zh	Цц	U u	Ts, ts
3 з	3 ,	Z, z	Чч	4 4	Ch, ch
<i>*</i>	И и	I, i	ய ய	Ш ш	Sh, sh
ř ž	A i	Y , y	Щщ	Щщ	Sheh, sheh
4. R	K ĸ	K, k	व र्व	ъ.	11
	ЛА	L, 1	Ыы	<i>L</i>	Y, y
W. W.	Мм	M, m	р	<i>b</i> .	•
₽ ₽	Н н	N, n	Ээ	9 ,	E, e
₋ 5	0 0	O, c	Юю	10 n	Yu, yu
- n	Пп	P, p	Яя	Яя	Ya, ya

* \underline{ye} initially, after vowels, and after e, e; \underline{e} elsewhere. When written as e in Russian, transliterate as \underline{ye} or e.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	sinh_1
cos	cos	ch	cosh	arc ch	cosh_1
tg	tan	th	tanh	arc th	tanh ^l
ctg	cot	cth	coth	arc cth	coth ¹
sec	sec	sch	sech	arc sch	sech_1
cosec	csc	csch	csch	arc csch	csch ⁻¹

Russian	English		
rot	cur1		
1g	log		

GRAPHICS DISCLAIMER

All figures, graphics, tables, equations, etc. merged into this translation were extracted from the best quality copy available.

Page 236.

FRONTAL CLOUDS AND FLIGHT CONDITIONS IN THEM.

A. M. Baranov.

TABLE OF CONTENTS:

Preface ... 3.

Introduction ... 5.

Part 1. THREE-DIMENSIONAL STRUCTURE OF FRONTAL CLOUDS;

Chapter 1. From the History of the Development of Representations about the Three-Dimensional Structure of Frontal Clouds ... 9.

- 1. Representations About the Three-Dimensional firsture of Clouds, Which Preceded the Creation of the Frontolog cal Method ... 9.
- 2. Initial Representations About the Tree-Dimensional Structure of Frontal Clouds ... 14.
- 3. Further Development of Ideas About the Three-Dimensional Structure of Frontal Clouds ... 17.
- 4. Analysis of the Three-Dimensional Structure of Frontal Clouds with the Aid of Artificial Earth Satellites ... 27.

- Chapter 2. Three-Dimensional Structure of the Clouds of Warm Front ... 32.
- 1. Height of Lower Cloud Base of Warm Front ... 32.
- 2. Height of the Upper Cloud Boundary of Warm Front ... 36.
- 3. Vertical Extent of the Clouds of Warm Front ... 43.
- 4. Stratification of the Clouds of Warm Front ... 48.
- 5. Thickness of Cloud Layers on Warm Front ...50.
- 6. Thickness of Cloudless Layers in the Cloud Systems of Warm Front ... 53.
- 7. Horizontal Extent of the Clouds of Warm Front ... 56.
- 8. High-level Cloud in the Zone of Warm Front ... 59.
- 9. Cumulonimbus Clouds in the Zone of Warm Front ... 80.
- 10. Special Feature of Upper Wind in the Zone of Warm Front
 ... 82.
- 11. Examples of the Three-Dimensional Structure of the Clouds of Warm Front ... 92.
- 12. Recommendations Regarding the Diagnosis of the Height of Cloudiness of the Warm Front ... 101.
- Chapter 3. Three-Dimensional Structure of Cold-Front Clouds ...
 118.
- 1. Height of Lower Cloud Base of Cold Fronts ... 118.
- 2. Height of the Upper Cloud Boundary of Cold Fronts ... 124.
- 3. Vertical Extent of Cold-Front Clouds ... 129.
- 4. Stratification of Cold-Front Clouds ... 133.
- 5. Thickness of Cloud Layers in the Zone of Cold Fronts ... 135.
- 6. Horizontal Extent of Cold-Front Clouds ... 137.

Page 237.

- 7. High-Level Cloud in the Zone of Cold Fronts ... 138.
- 8. Cumulonimbus Clouds in the Zone of Cold Fronts ... 140.
- 9. Example of the State of Cloudiness on Cold Front ... 143.
- 10. Some Recommendations for the Diagnosis of the Three-Dimensional Structure of Cold-Front Clouds ... 148.

Chapter 4. Three-Dimensional Structure of the Clouds of Occluded Fronts ... 150.

- 1. Height of Lower Cloud Base of Occluded Fronts ... 150.
- 2. Height of the Upper Cloud Boundary of Occluded Fronts ... 153.
- 3. Vertical Extent of the Clouds of Occluded Fronts ... 157.
- 4. Stratification of the Clouds of Occluded Fronts ... 160.
- 5. Thickness of Cloud Layers and Cloudless Layers in the Zone of Occluded Fronts ... 161.
- 6. Horizontal Extent of the Clouds of Occluded Fronts ... 166.
- 7. High-Level Cloud in the Zone of Occluded Fronts ... 168.
- 8. Cumulonimbus Clouds in the Zone of Occluded Fronts ... 172.
- 9. Some Recommendations for the Diagnosis of Clouds of Occluded Fronts ... 173.

Chapter 5. Three-Dimensional Structure of the Clouds of Secondary Cold Fronts ... 174.

1. Contemporary Concepts About the Reasons for the Formation of Secondary Cold Fronts and Formation of Cloudiness in them ...

- 2. Height of Lower Cloud Base at Secondary Cold Fronts ... 175.
- 3. Height of the Upper Cloud Boundary at Secondary Cold Fronts ...
- 4. Vertical Extent of the Clouds of Secondary Cold Fronts ...180.
- 5. Stratification of Clouds, the Thickness of Cloud Layers and Cloudless Layers in the Zone of Secondary Cold Fronts ... 181.
- 6. Horizontal Extent of the Clouds of Secondary Cold Fronts ...
 183.
- 7. High-Level Cloud in the Zone of Secondary Cold Fronts ... 183.
- 8. Cumulonimbus Clouds in the Zone of Secondary Cold Fronts ... 185.

Part 2. Meteorological Flight Conditions in Frontal Clouds. Kan de:

Camado and the Camado, Camado, Fronta (Meteorology)

Chapter 6. Meteorological Flight Conditions in the Clouds of Warm

Front ... 187.

- 1. Basic Factors, Which Determine Meteorological Flight Conditions in Clouds ... 187.
- 2. Value of Cloudiness for the Work of Aviation ... 188.
- 3. Repetition of Clouds at Different Heights in the Zone of Warm Front ... 192.
- 4. Visibility in the Clouds of Warm Front ... 195.
- 5. Turbulence in the Clouds of Warm Front ... 197.
- 6. Icing in the High-Level Clouds of Warm Front ... 199.
- 7. Electrification of Aircraft in High-Level Clouds of Warm Front ... 203.

- Russian translativing, (SLE),

Page 238.

Chapter 7. Meteorological Flight Conditions in the Clouds of Primary and Secondary Cold Fronts and Occluded Fronts ... 204.

- 1. Meteorological Flight Conditions in Thick Cumulus and Cumulonimbus Cold-Front Clouds ... 204.
- 2. Flight Conditions in the Zone of Thunderstorm Activity ...
- 3. Recurrence of Clouds at Different Heights in the Zone of Cold Fronts ... 210.
- 4. Recurrence of the Clouds of Secondary Cold Fronts at Different heights ... 212.
- 5. Recommendation to Crews, Which Fly in the Zone of Thick Cumulus, Cumulonimbus Clouds and in the Zone of Thunderstorm Activity ... 213.
- 6. Meteorological Flight Conditions in the Clouds of Occluded Fronts ... 215.

Conclusion ... 219.

Literature ... 225.

DISTRIBUTION LIST

DISTRIBUTION DIRECT TO RECIPIENT

ORGANIZATION	MICROFICHE
A205 DMAHTC	1
C509 BALLISTIC RES LAB	1
C510 R&T LABS/ANEADCOM	1
C513 ARRADCO'!	1
C535 AVRADCOM/TSARCOM	1
C539 TRASANA	1
C591 FSTC	4
C619 MIA REDSTONE	1
DOOS MISC	
E053 HQ USAF/INET	1
E404 AEDC/DOF	1
E408 AFN1	1
E410 AD/IND	1
F429 SD/IND	1
POOS DOE/ISA/DDI	1
POSO CIA/OCR/ADI/SD	2
AFIT/LIF	1
FTD	•
CC/.	1
MIA/PHS	1
LLYL CODE 1-389	1
NASA 'NST-44	1
NSA/TS13/TPL	2
ASD/FTD/TQLA	1
FSL/NIN-3	1
NOIC/OIC-9	1